

Tactical Control System
Flight Route Planner To Tactical Control System
Interface Design Description
Version 1.0



Prepared for:

Program Executive Officer, Cruise Missiles Project
and Unmanned Air Vehicles Joint Project

Prepared by:

Naval Surface Warfare Center-Dahlgren Division
Strategic and Strike Systems Department (K63)
Dahlgren, VA 22448

October 1997

Approved by: _____
TCS Program Manager

Date: _____

Table of Contents

1. Scope.....	1
1.1 Identification	1
1.2 System Overview	1
1.3 Document Overview.....	1
2. Reference Documents	3
2.1 Military Standards.....	3
2.2 TCS Documents	3
2.3 Other Documents	3
3. Interface Design	5
3.1 Interface Identification and Diagrams	5
3.2 File Format Interface.....	5
3.2.1 File Overview.....	5
3.2.2 Data Elements	6
3.2.3 Route Descriptor	6
3.2.4 Waypoint File.....	7
3.2.5 Action Point File	8
3.2.6 SAR Plan File.....	9
3.2.7 EO/IR Plan File	11
3.3 Data Server Interface.....	12
3.3.1 Upload Notification Object.....	12
3.3.2 Mission List Object.....	13
3.3.3 Telemetry Data.....	16
4. Requirements Traceability	17
5. Notes	19
5.1 Acronyms	19

1. Scope

1.1 Identification

This document describes two interfaces for the Flight Route planner: 1) The files that the planner will produce that describe fully the information needed to enable a Unmanned Aerial Vehicle to fly in a programmed flight mode. This interface will be designated the File Format Interface. 2) The method the planner will use to notify the TCS core software that a flight route plan is ready for upload and telemetry data that is available to the planner to accomplish mission analysis for plan re-tasking. This interface will be designated the Data Server Interface.

1.2 System Overview

TBD

1.3 Document Overview

TBD

2. Reference Documents

Copies of the specifications, standards, drawings, and publications listed in the next two subsections that are required by suppliers in connection with specified procurement functions should be obtained from the contracting agency or as directed by the contracting officer.

2.1 Military Standards

The following documents listed below form part of this specification to the extent of the organization and format of this document.

DOD-STD-498 Military Standard, Software Development and Documentation

DI-IPSC-81436 Interface Design Description

2.2 TCS Documents

The following documents listed below form part of this specification to the extent of understanding the requirements the DS and its API fulfill to accomplish their task. In the event of conflict between the documents referenced and the content of this specification, the contents of this specification shall be considered a superseding requirement. If the specified revision of the document is not listed, the current approved issue of the document applies.

TCS 103 Tactical Control System Software Requirements Specification

TCS 229 Tactical Control System Segment to Air Vehicle Standard Segment Interface Design Description

TCS 238 Tactical Control System Data Server API IDD

TCS 245 Tactical Control System Interprocess Communication API IDD

TCS xxx Tactical Control System Text Schema Interface Design Description

2.3 Other Documents

RFC 1014 External Data Representation Standard

3. Interface Design

Section 3.2 describes the file formats and data elements that describe a flight route. The files described in this section are the end result of the planning process accomplished by the planner.

Section 3.3 describes the interface between the Flight Route Planner and TCS core software. Specifically, the method of notification to TCS that a plan is ready for upload, the Air vehicles that are capable of accepting a mission plan upload and uplink/downlink data that is available to the planner to accomplish mission analysis.

3.1 Interface Identification and Diagrams

TBD

3.2 File Format Interface

3.2.1 File Overview

A flight route consists five files that describe fully the route an unmanned air vehicle will travel and various control functions that will be executed during the flight. The five files of a flight route are: 1) Route Descriptor (section 3.2.3) 2) Waypoints (section 3.2.4) 3) Action Points (section 3.2.5) 4) Synthetic Aperture Radar (SAR) Plan (section 3.2.6) and 5) EO/IR Plan (section 3.2.7). A flight route also consists of an optional set of emergency route plans. The emergency route plan uses the same file format and structure as a 'normal' flight route plan. The files for a route are related by two methods. The first method is the files will have a common basename followed by an extension that identifies the type of file (see table XXX). The second method is an overriding method is the 'Plan Id' field contained in each file. The 'Plan Id' is like a catalog number that is consistent for each of the five files regardless of the file name.

File Type	Extension
Route Descriptor	.rd
Waypoint	.wp
Action Point	.act
SAR Plan	.sar
EO/IR Plan	.eoir

The route descriptor contains general information concerning the route. The waypoint file contains information relative to direction (fly to position), speed and altitude. The action point file consists of various on board system functions to execute prior to or after a waypoint has been achieved. This depends on whether the system supports a 'fly to' or 'fly from' auto pilot. The SAR plan and EO/IR plan consist of information specific to a SAR or EO/IR payload commands at an action point.

3.2.1.1 Predator File Overview

The files that describe a mission plan for a Predator type air vehicle will consist of a minimum the route descriptor and the Waypoint file. The Action Point, EO/IR plan, and SAR plan files are optional and the presence of these files is indicated in the route descriptor file.

3.2.1.2 Outrider File Overview

The files that describe a mission plan for a Outrider type air vehicle will consist of only the route descriptor and Waypoint file.

3.2.2 Data Elements

All data elements shall comply with RFC1014 External Data Representation Standard. Specifically, all data elements shall map to the XDR data types Integer, Unsigned Integer, Floating Point, Double Precision Floating Point, and String. Strings may be any size unless constrained to a maximum size. Data elements shall be in the order specified in the document. All fields within a record shall be contiguous with no padding between fields. Position values (latitude/longitude) are expressed in WGS format.

3.2.3 Route Descriptor

The route descriptor file contains information that generally describe the flight route.

Route Descriptor			
Field	Type	Range	Description
1	String[64]		Classification
2	String[64]		Plan Id
3	String[64]		Plan name
4	String		Remarks (variable size)
5	Integer		File Creation Date and Time (GMT) Seconds since 1 Jan 1970
6	Integer		File Modification Date and Time (GMT) Seconds since 1 Jan 1970
7	Unsigned Integer	1 = Predator 2 = GNAT750 3 = Reserved 4 = Reserved 5 = Reserved 6 = Reserved 7 = Pioneer 8 = Outrider	Aircraft Type
8	String[12]		Tail Number
9	Unsigned Integer	0 .. 25,000 ft.	Minimum Terrain Clearance AGL
10	Integer		Launch Time (GMT) Seconds since 1 Jan 1970 (Growth)
11	Double	-90.0 .. 90.0 deg.	Launch Point Latitude
12	Double	-180.0 .. 180.0 deg.	Launch Point Longitude
13	Integer	-3000 .. 60,000 ft.	Launch Point Altitude MSL
14	Double	-90.0 .. 90.0 deg.	Recovery Point Latitude
15	Double	-180.0 .. 180.0 deg.	Recovery Point Longitude
16	Integer	-3000 .. 60,000 ft.	Recovery Point Altitude MSL
17	Unsigned Integer	0 .. 999	Number of Waypoints
18	Unsigned Integer	0 .. 999	Number of Action Points
19	Unsigned Integer	0 = Normal Plan 1 = Emergency Plan	Mission Plan Type
20	Unsigned Integer	0 = File Not Present 1 = File Present	Action Point File Present (This Field is zero (0) for Outrider)
21	Unsigned Integer	0 = File Not Present 1 = File Present	EO/IR Tasking File Present (This field is zero (0) for Outrider)
22	Unsigned Integer	0 = File Not Present 1 = File Present	SAR Tasking File Present (This field is zero (0) for Outrider)

3.2.4 Waypoint File

This section describes the structure of the waypoint file. The waypoint file consists of all the segments that describe a flight route. The overall format of the waypoint file is:

Waypoint File Header
Waypoint Record (1)
.
.
Waypoint Record (N)

3.2.4.1 Waypoint File Header

Waypoint File Header			
Field	Type	Range	Description
1	String[64]		Plan Id
2	Unsigned Integer	1 .. 999	Number of Waypoints

3.2.4.2 Waypoint Record

Waypoint Record			
Field	Type	Range	Description
1	Unsigned Integer	1 .. 999	Waypoint Number
2	String		Remarks (variable size)
3	Double	-90.0 .. 90.0 deg.	Latitude
4	Double	-180.0 .. 180.0 deg.	Longitude
5	Integer	-3,000 .. 60,000 ft. (Predator) -5,000 .. 20,000 ft. (Outrider)	Altitude MSL
6	Unsigned Integer	1 .. 200 Knots (Predator) 30 .. 120 Knots (Outrider)	Air Speed
7	Unsigned Integer	0 = Lines 1 = Points 2 = Arcs 3 = Heading	Flight Mode (Outrider)
8	Float	-270.0 .. -5.0 deg. (Left) 5.0 .. 270.0 deg. (Right)	Turning Arc (Outrider)
9	Unsigned Integer	0 = None 1 = N-Gon (6 points) 2 = Figure 8 3 = Reserved 4 = Relative Racetrack POINTS Mode 5 = Relative Racetrack ARCS Mode 6 = Fixed Racetrack	Loiter Pattern Mode Values 0-2, Predator Values 0, 4-6, Outrider
10	Integer	-5,000 .. 20,000 ft.	Racetrack Altitude MSL (Outrider)
11	Integer	30 .. 120 Knots	Racetrack Airspeed (Outrider)

12	Float	0 .. 359.99	Loiter Pattern Data Heading Degrees
13	Float	18228.36 .. 60761.20 ft. 18288.36 .. 303806.0 ft. -32768.0 .. 32768.0 ft.	N-Gon diameter (Predator) Figure-8 Width (Predator) Racetrack Mode Leg Right (Half Width) (Outrider)
14	Float	No Range 18228.36 .. 303806.0 ft. -32768.0 .. 32768.0 ft.	N-Gon not used (Predator) Figure-8 Length (Predator) Racetrack Mode Leg Forward (Half Length) (Outrider)
15	Unsigned Integer	1 .. 4096 Minutes	Loiter Pattern Time (Predator)
16	Unsigned Integer	0 .. 99	Loiter Pattern Loops (Outrider)

3.2.5 Action Point File

This section describes the structure of the action point file. The action point file consists of commands for various on board systems. The overall format of the action point file is:

Action Point File Header
Action point Record (1)
.
.
.
Action point Record (N)

3.2.5.1 Action Point File Header

Action Point File Header			
Field	Type	Range	Description
1	String[64]		Plan Id
2	Integer	1 .. 999	Number of Action Points

3.2.5.2 Action Point Record

Action Point Record			
Field	Type	Range	Description
1	Unsigned Integer		Action Point Number
2	Unsigned Integer		Waypoint # action record is linked to
3	String		Remarks (variable size)
4	Float		Distance from Waypoint (km) (Growth)
5	Unsigned Integer	1 = Baro MSL	Auto Pilot Altitude Modes
6	Unsigned Integer	1 = Reserved 2 = Indicated 3 = Reserved	Auto Pilot Airspeed Modes
7	Unsigned Integer		RTA Desired Arrival Time in GPS Reference Time, Weeks (week zero is Jan. 6, 1980) (Growth)

8	Unsigned Integer		RTA Desired Arrival Time in GPS Reference Time, Seconds, (seconds since midnight, Sunday) (Growth)
9	Unsigned Integer	0 = Continue to Next Waypoint 1 = Reserved 2 = Re-acquire/go to emergency Route	Loss of Link Command
10	Unsigned Integer	0 = Forward 1 = Reserved 2 = Emergency Route	Return To Base Action
11	Integer	-1 = No Communication 0 = Reserved 1 = Reserved 2 = Analog LOS Tx 2 3 - 7 Reserved 8 = WB-CDL, Tier II	Communication Link Select
12	Unsigned Integer	0 .. 100	Satcom Channel Number
13	Float	240.0 .. 16000.0 kHz	Communication Frequency
14	Double	-180.0 .. 180.0 deg.	Communication Satellite Longitude
15	Unsigned Integer	0 = Off 1 = On	IFF
16	Unsigned Integer	0 .. 7777 Octal	Squawk Code
17	Unsigned Integer	0 = Nose Camera 1 1 = EO 2 - Daylight 2 = FLIR 3 = EO 1 - Spotter 4 = Spare, 1 5 = Spare, 2 6 = Receiver 3	UAV VCR Video Source Review
18	Unsigned Integer	0..7 = Reserved 8 = Pause, Standby 9 = Record	UAV VCR Command Review

3.2.6 SAR Plan File

This section describes the structure of the SAR Plan file. The overall format of the SAR Plan file is:

SAR Plan File Header
SAR Plan Record (1)
• • •
SAR Plan Record (N)

3.2.6.1 SAR Plan File Header

SAR Plan Header			
Field	Type	Range	Description

1	String[64]		Plan Id
2	Unsigned Integer	0 = Operational Mission, preplanned mode 2 1 = Reserved 2 = Reserved	SAR Mission Plan Type
3	Unsigned Integer	1 = Semi-Interactive 1..255	Number of Tasks in Sensor Tasking Plan File.

3.2.6.2 SAR Plan Record

SAR Plan Record			
Field	Type	Range	Description
1	Unsigned Integer	0 .. 999	Waypoint # SAR Record is linked to
2	Unsigned Integer	1 = Semi-interactive 1 .. 255	SAR Collection Task Number (Growth)
3	String		Remarks (variable size)
4	Integer	-3,000 .. 60,000 ft.	Altitude MSL of collection point (Growth)
5	Unsigned Integer	1 = High 2 = Medium 3 = Low	Priority (Growth)
6	Unsigned Integer	0 = Standby 1 = Reserved 2 = Reserved 3 .. 9 Reserved 10 = Strip Mode 1 11 = Strip Mode 2 12 = Spot Mode 3 - Growth	SAR Mode Command
7	Unsigned Integer	0 = Disable (Growth) 1 = Enable	SAR Transmit Enable (Growth)
8	Unsigned Integer	0 = Constant All Other values Reserved	Link Type (Growth)
9	Unsigned Integer	0 .. 65535	Scene/Strip/Batch Number
10	Unsigned Integer	0 .. 999,990 Millimeters	Desired Resolution
11	Unsigned Integer	0 .. 30,000 m	Horizontal Range to Strip (Mode 1)
12	Float	-60.0 .. 120.0 deg. (Left) 60.0 .. 120.0 deg. (Right)	Mode 1 Squint Angle
13	Float	0 = Auto-Tilt -10.0 .. -60.0 deg.	Mode 1 Depression Angle
14	Double	-90.0 .. 90.0 deg.	Pointing Latitude, Center Point 1 (Start) (Mode 2 and Growth Mode 3, Spot)
15	Double	-180.0 .. 180.0 deg.	Pointing Longitude, Center Point 1 (Start) (Mode 2 and Growth Mode 3, Spot)
16	Double	-90.0 .. 90.0 deg.	Mode 2 Pointing Latitude, Center Point 2 (End)
17	Double	-180.0 .. 180.0 deg.	Mode 2 Pointing Longitude, Center Point 2 (End)
18	Float	-90.0 .. 90.0 deg.	Mode 2, Mapping Angle Angle between LOS and scene centerline normal
19	Unsigned Integer		Post Spacing
20	Unsigned Integer	1 .. 502	Number of DTED Posts

21	Integer[502]	-32767 = No Data 3,000 .. 10,000 Meters	Height of Terrain, MSL Mode 1 = Data is single value or a list of values Mode 2 = Data is ordered as data pairs Mode 3 = Data is ordered as pairs, Growth
----	--------------	--	--

3.2.7 EO/IR Plan File

This section describes the structure of the EO/IR Plan file. The overall format of the EO/IR Plan file is:

EOIR Plan File Header
EOIR Plan Record (1)
•
•
•
EOIR Plan Record (N)

3.2.7.1 EO/IR Plan File Header

EO/IR Plan Header			
Field	Type	Range	Description
1	String[64]		Plan Id
2	Unsigned Integer	0 = Operational Mission, preplanned 1..2 = Reserved	EO/IR Mission Plan Type
3	Unsigned Integer	1 .. 255	Number of Tasks in Sensor Tasking Plan File

3.2.7.2 EO/IR Record

EO/IR Record			
Field	Type	Range	Description
1	Unsigned Integer	0 .. 999	Waypoint # EO/IR record is linked to
2	Unsigned Integer	1 .. 255	EO/IR Collection Task Number (Growth)
3	String		Remarks (variable size)
4	Unsigned Integer	1 = High 2 = Medium 3 = Low	Priority (Growth)
5	Unsigned Integer	0 = IR 1 = EO1 2 = EO2	EO/IR Sensor Select
6	Unsigned Integer	0 = Position Reference (Heading) 1 = Position Fixed 2 = Reserved 3 = Reserved	EO/IR Pointing Mode
7	Float	-180.0 ..180.0 deg.	EO/IR Pointing Azimuth, (Ref. to nose of vehicle, clockwise is

			positive)
8	Float	-90.0 .. 90.0 deg.	EO/IR Pointing Depression Angle, (Ref. To wing, positive is down)
9	Double	-90.0 .. 90.0 deg.	EO/IR Fixed Pointing Latitude
10	Double	-180.0 .. 180.0 deg.	EO/IR Fixed Pointing Longitude
11	Integer	-3000..60,000 ft.	Altitude MSL of collection point
12	Unsigned Integer	If EO1 then 0 If EO2 then 0..100	Zoom Setting EO1, EO2 EO1 - Fixed Zoom
13	Unsigned Integer	0 = Manual 1 = Auto	Iris Mode EO1, EO2, IR (Growth)
14	Unsigned Integer	EO1 - (0..100) EO2 - (0..100) IR - (1..5)	Iris Setting EO1,EO2,IR (Growth)
15	Unsigned Integer	0 .. 100	Focus EO1,EO2,IR (Growth)
16	Unsigned Integer	0 = None 1 = 2X	IR FOV 2X
17	Unsigned Integer	0 = 19 mm 1 = 70 mm 2 = 280 mm	IR FOV
18	Unsigned Integer	0 = white 1 = black hot	IR Image Polarity

3.3 Data Server Interface

3.3.1 Upload Notification Object

This record is used by the flight route planner to notify TCS that the specified plan is ready for upload. The message is sent to TCS via the Data Server interface. The object name of this message is “upload_notification”, the schema name is “upload_notification”, and it is a child object of the “system” group.

3.3.1.1 Upload Notification Object Format

Notification Message			
Field	Type	Range	Description
1	String[64]		Plan Name Base filename of the plan to upload
2	String[64]		Plan Id The value of Plan Id matches the Plan Id field in route descriptor file
3	String[20]		Mission Id Identifies the Mission the Air Vehicle is flying
4	Unsigned Integer	0 = Normal Plan 1 = Emergency Plan	Plan Type
5	Integer	0 = Entire Plan 1 .. 999	Start Waypoint Number (Valid if Plan Type = 1)
6	Integer	1 .. 999	End Waypoint Number (Valid if Plan Type = 1)
7	Unsigned Integer	1 = Predator 2 = GNAT750 3 = Reserved	Aircraft Type Identifies the Air Vehicle Type that the mission will be built for

		4 = Outrider	
--	--	--------------	--

3.3.1.2 Upload Notification Object Text Schema

```
# upload_notification.dat
# Version: $Id$

#
#   Schema:
#       upload_notification
#
#   Description:
#       Upload notification contains the information needed to upload a flight
route.
#
#   Fields:
#       Version          - RCS or CVS version string
#       Config           - Direction to the schema compiler for placement of
                           the binary schema.
#
#
Upload_Notification
{
    # Version and configuration information
    Version "$Id$";          # RCS Version number
    Config  "common";        # Directory to put binary in

    Plan_Name:  string[64], <>,          , "Flight Route Plan Name";
    Plan_Id:    string[64], <>,          , "Flight Route Id";
    Plan_Type:  integer,      0, 0 .. 1   , , "Type of Plan";
    Mission_Id: string[20], <>,          , "Mission Id";
    Start_WP:   integer,      0, 0 .. 999 , , "Starting Waypoint";
    End_WP:     integer,      1, 1 .. 999 , , "Ending Waypoint";
    AV_Type:    integer,      1, 1 .. 4   , , "AV Type";
}
```

3.3.2 Mission List Object

The Mission list object is notification from TCS to the flight route planner that Air Vehicle command and status messages are available from the Data Server. The mission list . The message is sent from TCS via the Data Server interface. The object name of this message is "mission_list", the schema name is "mission_list", and it is a child object of the "system" group.

3.3.2.1 Mission List Object Format

Mission List Object			
Field	Type	Range	Description
1	Integer		Current Mission Index to the currently active mission
Fields 2 - 7 Repeat 8 Times			
2	Integer		State Of Entry This is a control variable for this entry
3	String[20]		Mission Id A mission identifier as well as the name of the group the status and control objects reside for the indicated mission

4	String[12]		AV Tail Number The Tail number of the mission air vehicle
5	Integer	1 = Predator 2 = Outrider 3 = SEAMOS 4 = Hunter 5 = Pioneer	AV Type Indicates the type of air vehicle that is flying the mission
6	Integer	TBD	State
7	String[20]		Track Id The track database Id for the mission

3.3.2.2 Mission List Object Text Schema

```
# mission_list.dat
# Version: $Id$

#
# Schema:
#   Mission_List
#
# Description:
#   Mission_List describes the missions available for monitoring
#   or control. This object is updated when a mission is added
#   or deleted from the system or when the State or Track_Id
#   values change.
#
# Fields:
#   Version          - RCS or CVS version string
#   Config            - Direction to the schema compiler for placement of
#                       the binary schema.
#
#   Current_Mission  - Index to the Currently active mission.
#
#   State_Of_Entry   - This is a control variable for entry. It has two
#                       values:  1 = Entry Available
#                               2 = Entry Used
#
#   Mission_Id       - A mission identifier as well as the name of the
#                       group the status and control objects reside for the
#                       indicated mission.
#
#   AV_Tail_Number   - The tail number of the Mission Air Vehicle.
#
#   AV_Type          - 1 = Predator
#                       2 = Outrider,
#                       3 = SEAMOS,
#                       4 = Hunter
#
#   State            - TBD
#
#   Track_Id         - Track database id for the mission.
#
# Notes:
#   This schema will be updated to use arrays and records when that
#   functionality is added to the schema compiler
#

Mission_List
{
    # Version and configuration information
    Version "$Id$";          # RCS Version number
```

```

Config  "common";          # Directory to put binary in

Current_Mission:  integer,    -1, -1 .. 7 , , "Current Mission";

State_Of_Entry0:  integer,     1,  1 .. 3 , , "State of Entry";
Mission_Id0:      string[20], <>,           , "Mission Id";
AV_Tail_Number0:  string[12], <>,           , "Tail Number";
AV_Type0:         integer,     1,  1 .. 4 , , "Air Vehicle Type";
State0:           integer,     1,  1 .. 4 , , "State of the System";
Track_Id0:        string[20], <>,           , "Track Database Id";

State_Of_Entry1:  integer,     1,  1 .. 3 , , "Is Entry Used";
Mission_Id1:      string[20], <>,           , "Mission Id";
AV_Tail_Number1:  string[12], <>,           , "Tail Number";
AV_Type1:         integer,     1,  1 .. 4 , , "Air Vehicle Type";
State1:           integer,     1,  1 .. 4 , , "State of the System";
Track_Id1:        string[20], <>,           , "Track Database Id";

State_Of_Entry2:  integer,     1,  1 .. 3 , , "Is Entry Used";
Mission_Id2:      string[20], <>,           , "Mission Id";
AV_Tail_Number2:  string[12], <>,           , "Tail Number";
AV_Type2:         integer,     1,  1 .. 4 , , "Air Vehicle Type";
State2:           integer,     1,  1 .. 4 , , "State of the System";
Track_Id2:        string[20], <>,           , "Track Database Id";

State_Of_Entry3:  integer,     1,  1 .. 3 , , "Is Entry Used";
Mission_Id3:      string[20], <>,           , "Mission Id";
AV_Tail_Number3:  string[12], <>,           , "Tail Number";
AV_Type3:         integer,     1,  1 .. 4 , , "Air Vehicle Type";
State3:           integer,     1,  1 .. 4 , , "State of the System";
Track_Id3:        string[20], <>,           , "Track Database Id";

State_Of_Entry4:  integer,     1,  1 .. 3 , , "Is Entry Used";
Mission_Id4:      string[20], <>,           , "Mission Id";
AV_Tail_Number4:  string[12], <>,           , "Tail Number";
AV_Type4:         integer,     1,  1 .. 4 , , "Air Vehicle Type";
State4:           integer,     1,  1 .. 4 , , "State of the System";
Track_Id4:        string[20], <>,           , "Track Database Id";

State_Of_Entry5:  integer,     1,  1 .. 3 , , "Is Entry Used";
Mission_Id5:      string[20], <>,           , "Mission Id";
AV_Tail_Number5:  string[12], <>,           , "Tail Number";
AV_Type5:         integer,     1,  1 .. 4 , , "Air Vehicle Type";
State5:           integer,     1,  1 .. 4 , , "State of the System";
Track_Id5:        string[20], <>,           , "Track Database Id";

State_Of_Entry6:  integer,     1,  1 .. 3 , , "Is Entry Used";
Mission_Id6:      string[20], <>,           , "Mission Id";
AV_Tail_Number6:  string[12], <>,           , "Tail Number";
AV_Type6:         integer,     1,  1 .. 4 , , "Air Vehicle Type";
State6:           integer,     1,  1 .. 4 , , "State of the System";
Track_Id6:        string[20], <>,           , "Track Database Id";

State_Of_Entry7:  integer,     1,  1 .. 3 , , "Is Entry Used";
Mission_Id7:      string[20], <>,           , "Mission Id";
AV_Tail_Number7:  string[12], <>,           , "Tail Number";
AV_Type7:         integer,     1,  1 .. 4 , , "Air Vehicle Type";
State7:           integer,     1,  1 .. 4 , , "State of the System";
Track_Id7:        string[20], <>,           , "Track Database Id";
}

```

3.3.3 Telemetry Data

Telemetry data for each mission is available from the Data Server. The telemetry objects for each mission reside in the groups identified by the 'mission_list' object. The telemetry objects mirror the downlink messages that are defined in document TCS 229 Tactical Control System Segment to Air Vehicle Standard Segment Interface Design Description. The schemas definitions for the telemetry objects are defined in document TCS xxx Tactical Control System Text Schema Interface Design Description.

4. Requirements Traceability

This section has been tailored out.

5. Notes

5.1 Acronyms

AGL	Above Ground Level
EO/IR	Electro Optical/Infrared
MSL	Mean Sea Level
SAR	Synthetic Aperture Radar
TBD	To Be Determined
TCS	Tactical Control System